

Graphing

# Graphing

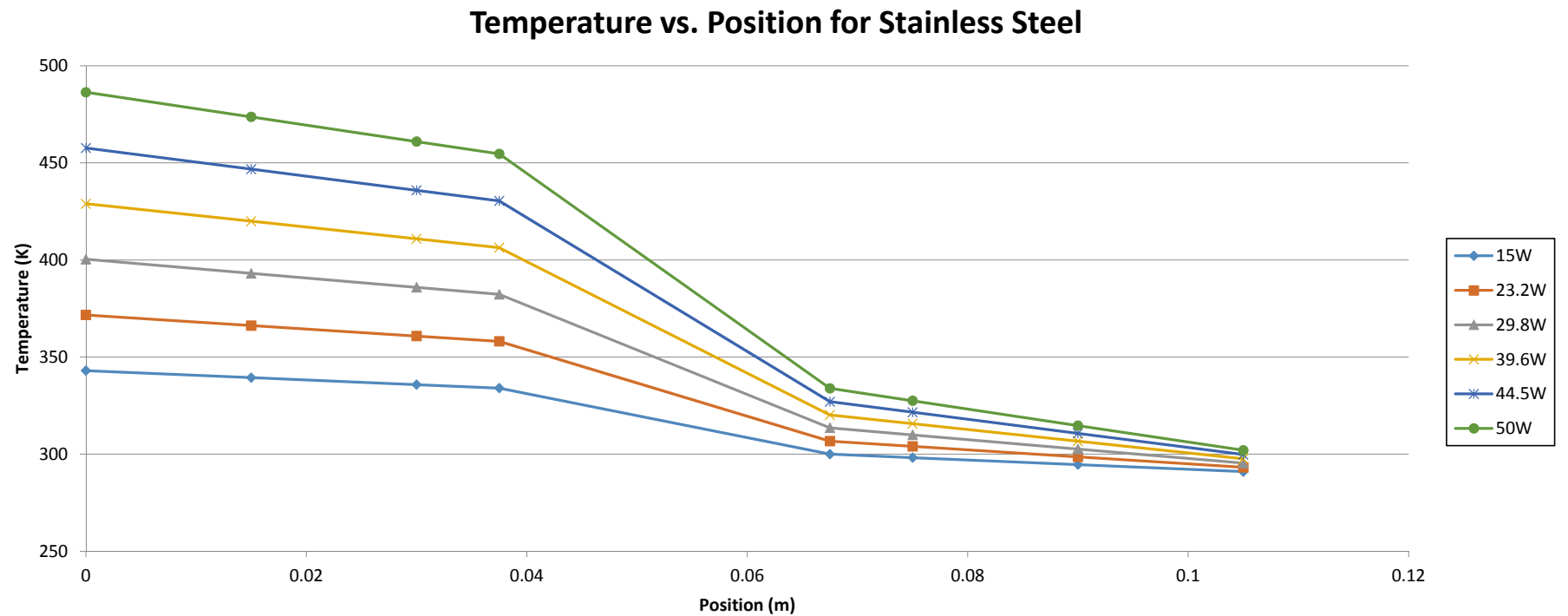
- Graphs display the relation between typically two variable quantities, each measured along one of a pair of axes at right angles
- Graphs are important because they communicate information visually



# Example Data

Stainless Steel Sample, Diameter=25mm, k=?								
Q_heater	T1	T2	T3	T_hotface from Resistances	T_coldface from Resistances	T6	T7	T8
[W]	[K]	[K]	[K]	[K]	[K]	[K]	[K]	[K]
15	343	339.4	335.8	334	300	298.2	294.6	291
23.2	371.7	366.2	360.8	358.1	306.7	304	298.6	293.2
29.8	400.4	393.1	385.9	382.3	313.55	309.9	302.6	295.4
39.6	429	420	410.9	406.35	320.2	315.7	306.7	297.6
44.5	457.7	446.8	435.9	430.45	327.05	321.6	310.7	299.8
50	486.4	473.7	461	454.65	333.9	327.5	314.7	302
Position (m)	0	0.015	0.03	0.0375	0.0675	0.075	0.09	0.105

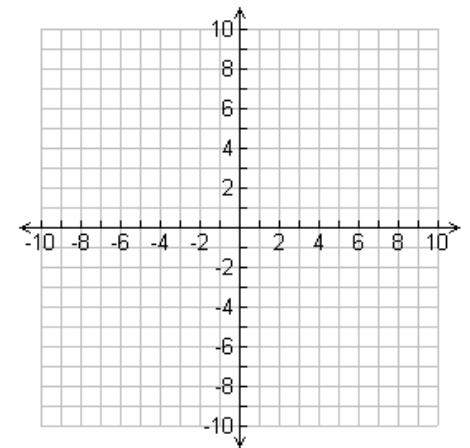
# Example Graph



# Graphing: Basics

## The Basic Components:

- **Title:** tells what the graph shows
- **X-axis Label:** tells what the x-axis values represent
- **Y-axis Label:** tells what the y-axis values represent
- **X-axis Values:** quantity of what is measured on x-axis
- **Y-axis Values:** quantity of what is measured on y-axis



# Data

- A variable is what is measured or manipulated in an experiment
- Independent Variable
- Dependent Variable

# Independent Variable

- An independent variable is the variable you have control over, what you can choose and manipulate
- It is usually what you think will affect the dependent variable
- In some cases, you may not be able to manipulate the independent variable
- It may be something that is already there and is fixed, something you would like to evaluate with respect to how it affects something else, the dependent variable like color, kind, time

# Dependent Variable

- A dependent variable is what you measure in the experiment and what is affected during the experiment
- The dependent variable responds to the independent variable
- It is called dependent because it "depends" on the independent variable
- In a scientific experiment, you cannot have a dependent variable without an independent variable

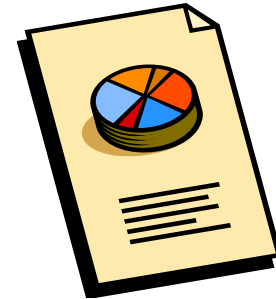
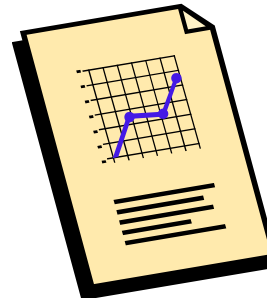


# Example

- You are interested in how stress affects heart rate in humans
- Independent variable
  - Would be the stress
- Dependent variable
  - Would be the heart rate
- You can directly manipulate stress levels in your human subjects and measure how those stress levels change heart rate

# Graphing: Types

- Bar graph
- Line graph
- Point graph
- Pie graph



Most Important thing for Graphing

**THINK** about what you  
are graphing

(this seems silly, but it helps!)

# Graphing in Excel

- This will make your life easier
- **HOW to Graph in Excel:**
  - 1) Open up **Excel** in Microsoft Office
  - 2) Enter your **data**: **THINK**: what do you want on the x-axis and what do you want on the y-axis?
  - 3) **Highlight** the data and click “**Insert**”
  - 4) Choose the **graph type** you want
  - 5) **Edit** the graph so you have the key components.

**REMEMBER:** Ask yourself: does this look right and does the graph show what I want it to show?



# Example of Graph in Excel

**Plant Growth over 8 days:**

Day	0	2	4	6	8
Height (cm)	0	1	2	3	4